Masoneilan* 77000 Series High-Pressure Labyrinth Trim Control Valve

These valves provide high pressure, compressible fluid control without the erosion, vibration and high noise associated with conventional control valves.

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Features and Benefits

GE's Masoneilan* 77000 series high-pressure labyrinth trim control valve from GE delivers exceptionally stable control and durable service life while saving replacement and maintenance costs. It provides high-pressure, compressible fluid control without the erosion, vibration, and high noise associated with conventional control valves.

Ideal for service in multi-phase flow applications, the Masoneilan* 77000 series valve's advanced energy management trim design stands up to the damaging and abrasive conditions caused by entrained liquids/solids or liquids with entrained solids. It features an expanding area flow passage, and its multiple step plug and seat ring design creates a beneficial shearing action across each stage to manage the gradual pressure reduction.

Energy Management Trim

This valve applies the principle of energy management technology to gradually reduce pressure through the creation of flow path friction. This simulates the gradual pressure loss that occurs over long pipelines. By passing the fluid through a number of restrictions, referred to as pressure reduction stages, the Masoneilan* 77000 series valve's tortuous flow pattern dissipates energy through high head loss rather than through shock waves.

Additionally, the flow area of the trim is gradually increased at the latter stages of the design to compensate for the volumetric expansion of the gas caused by the reduction in pressure. This ensures nearly constant fluid velocity throughout the complete throttling process and eliminates the damaging effects of high energy spikes within the trim.

The reduced velocity minimizes the impact of erosion caused by entrained solids or liquids resulting from a process fluid phase change. Plus, the acoustical performance of the valve is optimized through alignment of the pressure drop ratio with the trim expansion factor. In some cases, downstream Lo-dB cartridges or custom design trim areas are integrated into the control valve design for extremely high-pressure drop ratios.

The unique axial flow construction of the Masoneilan* 77000 series valve is optimal for flashing or de-gassing applications. The axial flow path within the angle body design directs the two-phase fluid away from critical surfaces and the downstream pipe wall.

Smooth, Stable Control

The high range (50:1) of this multi-stage valve allows wide variations in controlled flow. Intermediate pressure flows through internal plug porting for exceptional control stability. This creates a balance force within the plug to minimize unbalanced force acting on the trim.

What's more, this uniquely balanced trim design has no secondary balancing seal and only a single point for seat contact.

A toggle design for the actuation system provides high force amplification through mechanical leverage resulting in stable control during the throttling phase.

Adding GE's Masoneilan* SVI* II Advanced Performance positioner provides further process control, delivering high-precision valve control and immediate response to the smallest step change in signal.

Cavitation Elimination

The valve's multi-stage trim design reduces the pressure drop in smaller increments without allowing the local pressure at each stage to drop below the fluid vapor pressure, thus preventing cavitation. The actively controlled stages of this axial flow design valve throttle in unison to avoid the adverse effects of an exaggerated reduction at any single stage.

Dirt Tolerance

Wide flow paths in the trim allow for passage of large particles entrained within the flow stream that would otherwise cause damage or loss of capacity. This ensures continuous and efficient operation by eliminating concerns of potential clogging due to debris in the flow stream. GE's Masoneilan* 77000 series valve offers a proven design for many high-pressure, dirty service applications, including wellhead choke valves.

Reliable Tight Shutoff

The standard seat design's leakage rating meets IEC534-4 and ANSI/FCI 70.2 Class V shutoff requirements. The valve can also be supplied with block valve tight shutoff to comply with MSS-SP-61 specifications.

Features and Benefits

Ease of Maintenance

GE's Masoneilan* 77000 series valve comes in two design styles for easy trim access in the field; a bottom-loaded flanged end connection design and a top-loaded butt-weld end design provide field maintenance flexibility.

In addition, short valve travel reduces packing wear and significantly extends packing life, particularly in high-pressure/ high-temperature service.

Enhanced service life is achieved through the trim's heavy guiding coupled with the use of hardened materials on the seat and guiding surfaces.

NACE and PED Compliance

GE's Masoneilan 77000 series valve is available for sour service applications using the design and construction methods defined in NACE standard MR0103. Product configurations for applications requiring MR0175 – 2003 or ISO 15156 compliance are also available. In addition, the valve is designed for compliance with Pressure Equipment Directives (PED) requirements.

Noise Prediction

Valve noise calculations can be performed using GE's Masoneilan* sizing and selection program based on the latest IEC equations. Since noise intensity of a free gas jet varies to the eighth power of the velocity, a 4:1 reduction in fluid through the expanding area can reduce the expected noise level approximately 255 times (equivalent to 24 dB). When predicting the overall noise level produced by the control valve system, calculations of the noise levels at all stages of the trim and at the outlet area are all considered.

General Data

Flow Direction

Standard:	Flow-to-open

- Body

Type:	Cast or forged angle style
Sizes:	1-inch to 8-inch (expanding outlets available) (DN 25 to 200)
Ratings:	ANSI Class 600 to 2500 (ISO PN 100 to 420) API Class 2000 to 10000
End Connections:	RF Flange, RTJ flange Print flanges (forgings only) BWE and SWE (available for 2-inch and under)

- Bonnet

Type:	Bottom entry; bolted outlet spool Top entry; bolted bonnet

- Body and Bonnet

Materials:	Carbon steel Stainless steel Chrome-moly

- Trim

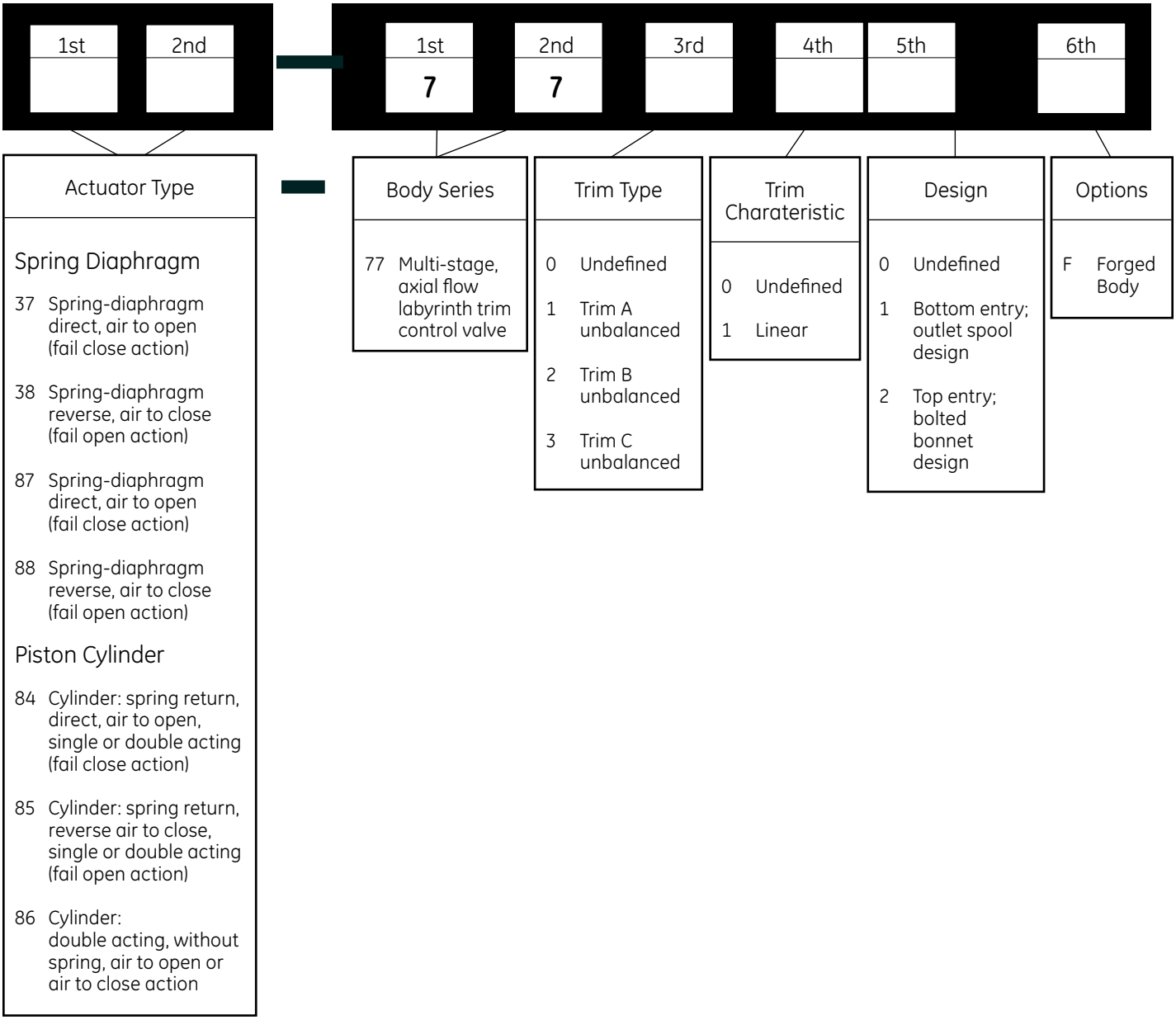
Plug type:	Multi-stage axial flow (Trim A, B, C options)
Seat type:	Metal seat
Guide:	Top and bottom guiding
Cv Ratio:	See table (page 7)
Flow Characteristic:	Linear

- Actuator

Mounting:	Toggle arm mount Direct mount
Type:	Spring-diaphragm Spring-return cylinder Double-acting cylinder
Handwheel:	Optional

Optional designs are also available, such as larger sizes, higher pressure ratings, special materials, modified staging, and other configurations as required. Contact GE for design details and specifications.

Numbering System



Temperature Range/Seat Leakage

Valve Size [3]	ANSI Class	API Rating	Trim Type	Seat Type	Temperature Range [1]		Seat Leakage [2]
					Min.	Max.	
1-inch x 2-inch through	600 through 2500	2000 through 10000	Unbalanced	Metal	-20° F (-29° C)	1050° F (565° C)	IV or V

1. Designs for higher or lower temperatures are available. Please consult GE.
2. Seat leakage class ratings per IEC 534-4 and ANSI/FCI 70.2. Class IV is the standard and Class V is optional.
3. Inlet and outlet connections also available with API size ranges.

Expanding Area Trim Design

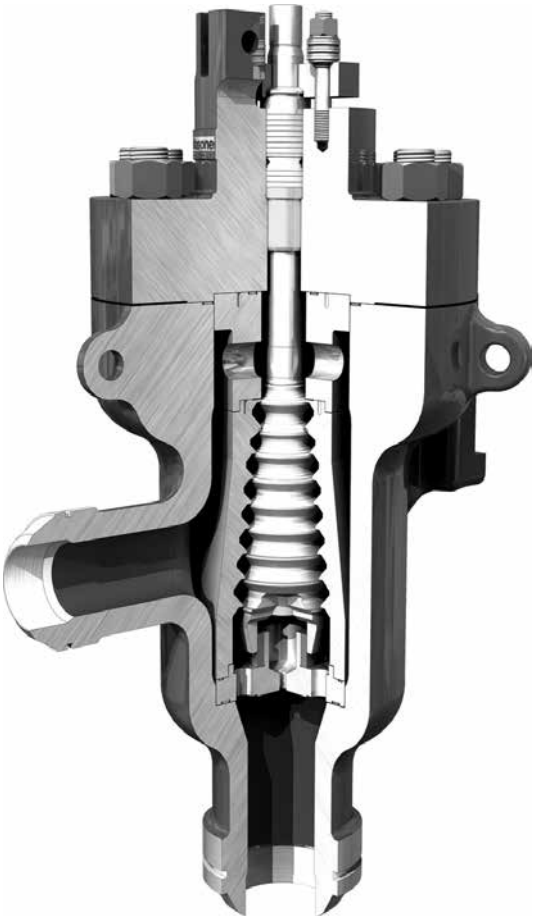
The circumference of each pressure reduction stage within the Masoneilan* 77000 series trim is designed to gradually increase as flow moves towards the downstream section. This expansion compensates for the change in gas density with the pressure and ensures a nearly constant fluid velocity throughout the complete throttling process, providing the valve with two advantages:

1. Reduction in noise produced by the fluid velocity
2. Considerable decrease in erosion of the plug and seat liner caused by particulate in the flow stream or fluid flashing

For many applications that experience flashing service conditions, such as supercritical power plant start-up valves or hot high-pressure separator letdown in refineries, the Masoneilan* 77000 series valve provides a low-velocity outlet area to minimize any effect of the phase transformation process. Similarly for applications with entrained solids, such as gas wellhead choke applications, the valve reduces the velocity of the moving particulate to minimize wear and erosive damage to the trim and outlet flow area.

Many designs include a larger outlet compared to the inlet size to retain the low velocity as the fluid exits the valve into the downstream piping. This arrangement eliminates the need for additional piping modifications, such as downstream reducers.

77000 Series High-Pressure Labyrinth Trim Control Valve



77000 Series Top Entry

77000 Series Bottom Entry

Sizes and Ratings (ANSI Class)

☐RF Flange ⓞSocket Weld ○Threaded ◆RTJ Flange ■Butt Weld

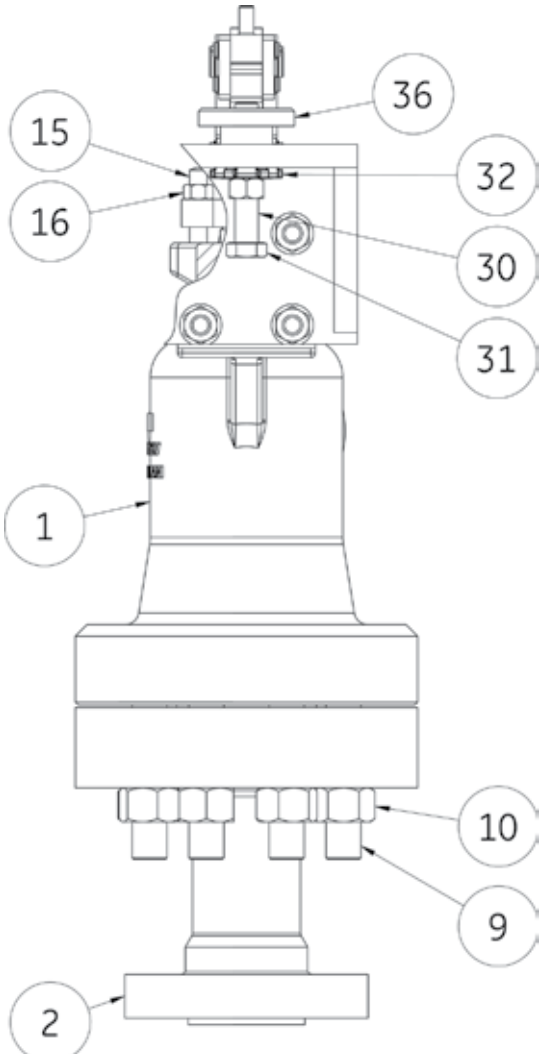
Valve Size (inch)	Outlet Options	ANSI 600(1) API 2000	ANSI 900(1) API 3000	ANSI 1500(1) API 5000	ANSI 2500 API 10000
1	1	☐ⓞ○◆■	☐ⓞ○◆■	☐ⓞ○◆■	☐ⓞ○◆■
	2	☐ⓞ○◆■	☐ⓞ○◆■	☐ⓞ○◆■	☐ⓞ○◆■
	3	☐ⓞ○◆■	☐ⓞ○◆■	☐ⓞ○◆■	☐ⓞ○◆■
2	2	☐ⓞ○◆■	☐ⓞ○◆■	☐ⓞ○◆■	☐ⓞ○◆■
	3	☐ⓞ○◆■	☐ⓞ○◆■	☐ⓞ○◆■	☐ⓞ○◆■
	4	☐ⓞ○◆■	☐ⓞ○◆■	☐ⓞ○◆■	☐ⓞ○◆■
3	3	☐◆■	☐◆■	☐◆■	☐◆■
	4	☐◆■	☐◆■	☐◆■	☐◆■
	6	☐◆■	☐◆■	☐◆■	☐◆■
4	4	☐◆■	☐◆■	☐◆■	☐◆■
	6	☐◆■	☐◆■	☐◆■	☐◆■
	8	☐◆■	☐◆■	☐◆■	☐◆■
6	6	☐◆■	☐◆■	☐◆■	☐◆■
	8	☐◆■	☐◆■	☐◆■	☐◆■
	10	☐◆■	☐◆■	☐◆■	☐◆■
8	8	☐◆■	☐◆■	☐◆■	☐◆■
	10	☐◆■	☐◆■	☐◆■	☐◆■
	12	☐◆■	☐◆■	☐◆■	☐◆■

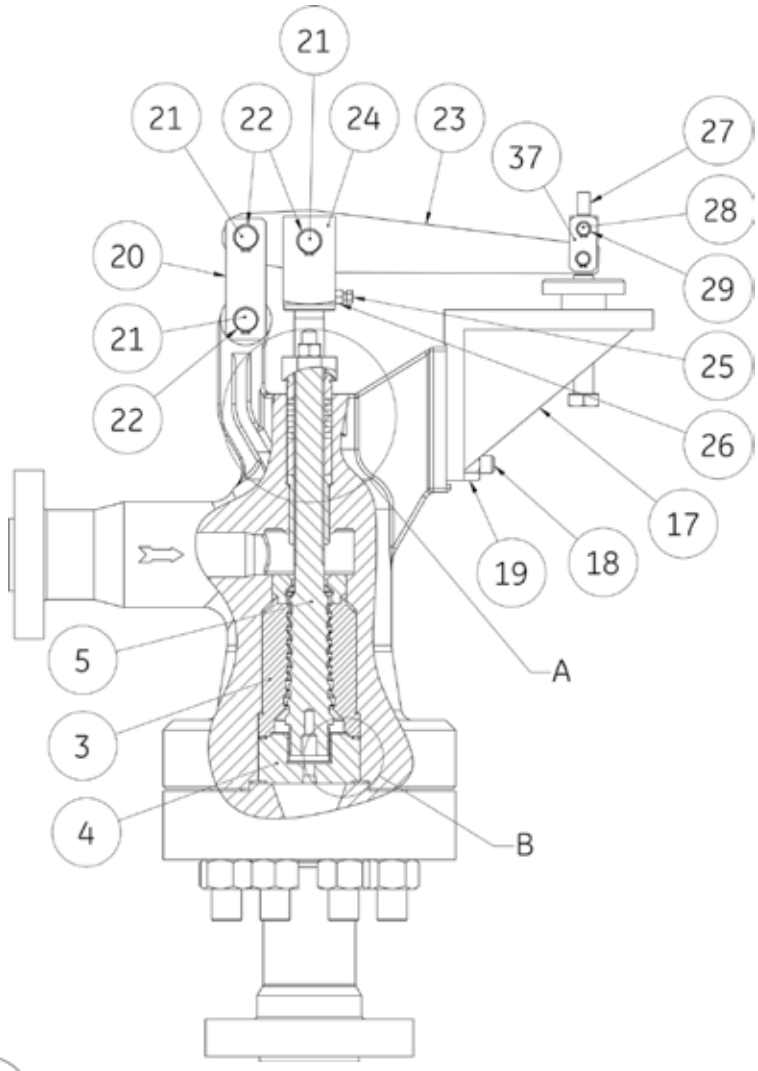
1) Machined from an ANSI 1500/API 5000 rated body 2) API and special valve connections available upon request

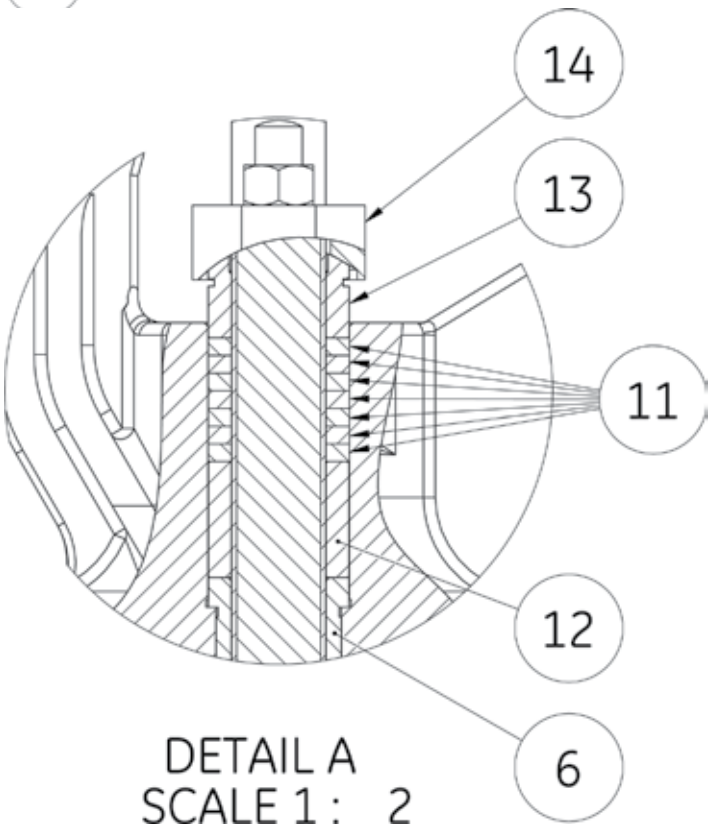
Flow Coefficient (C_V) and Expansion Ratio

Valve Size (inch)	Outlet Options (Inch)	Trim Size A		Trim Size B		Trim Size C	
		Expansion Ratio	C_V	Expansion Ratio	C_V	Expansion Ratio	C_V
1	1	4:1	2	2:1	4	1.5:1	6
	2	4:1	2	2:1	4	1.5:1	6
	3	4:1	2	2:1	4	1.5:1	6
2	2	4:1	12	2:1	22	1.5:1	35
	3	4:1	12	2:1	22	1.5:1	35
	4	4:1	12	2:1	22	1.5:1	35
3	3	4:1	31	2:1	45	1.5:1	72
	4	4:1	31	2:1	45	1.5:1	72
	6	4:1	31	2:1	45	1.5:1	72
4	4	4:1	54	2:1	72	1.5:1	110
	6	4:1	54	2:1	72	1.5:1	110
	8	4:1	54	2:1	72	1.5:1	110
6	6	4:1	72	2:1	120	1.5:1	170
	8	4:1	72	2:1	120	1.5:1	170
	10	4:1	72	2:1	120	1.5:1	170
8	8	4:1	120	2:1	180	1.5:1	260
	10	4:1	120	2:1	180	1.5:1	260
	12	4:1	120	2:1	180	1.5:1	260

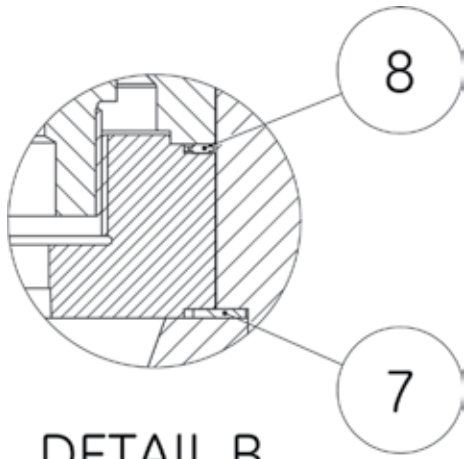
* Note: Special designs with oversized and reduced Cv trim are available. Please consult GE.







DETAIL A
SCALE 1 : 2

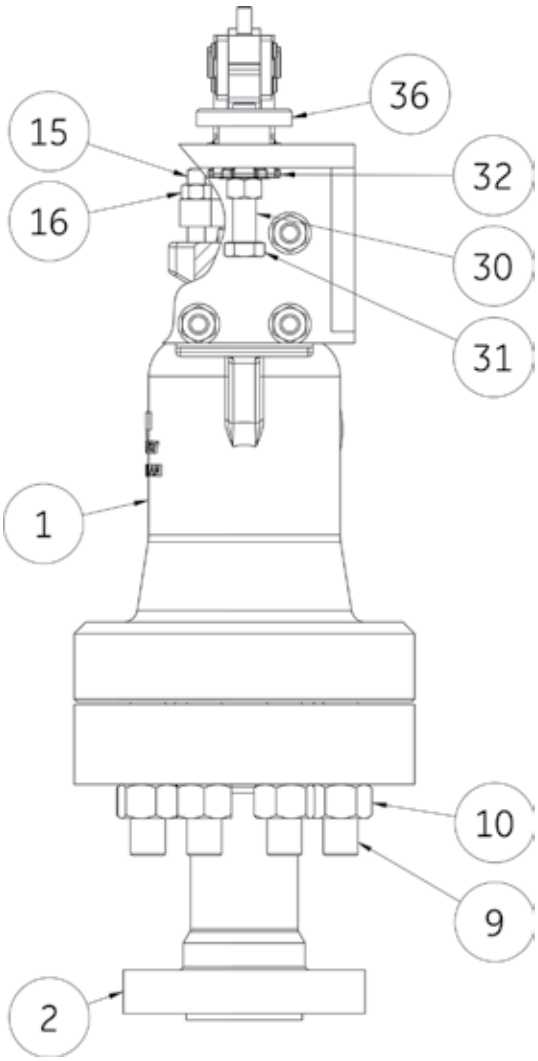


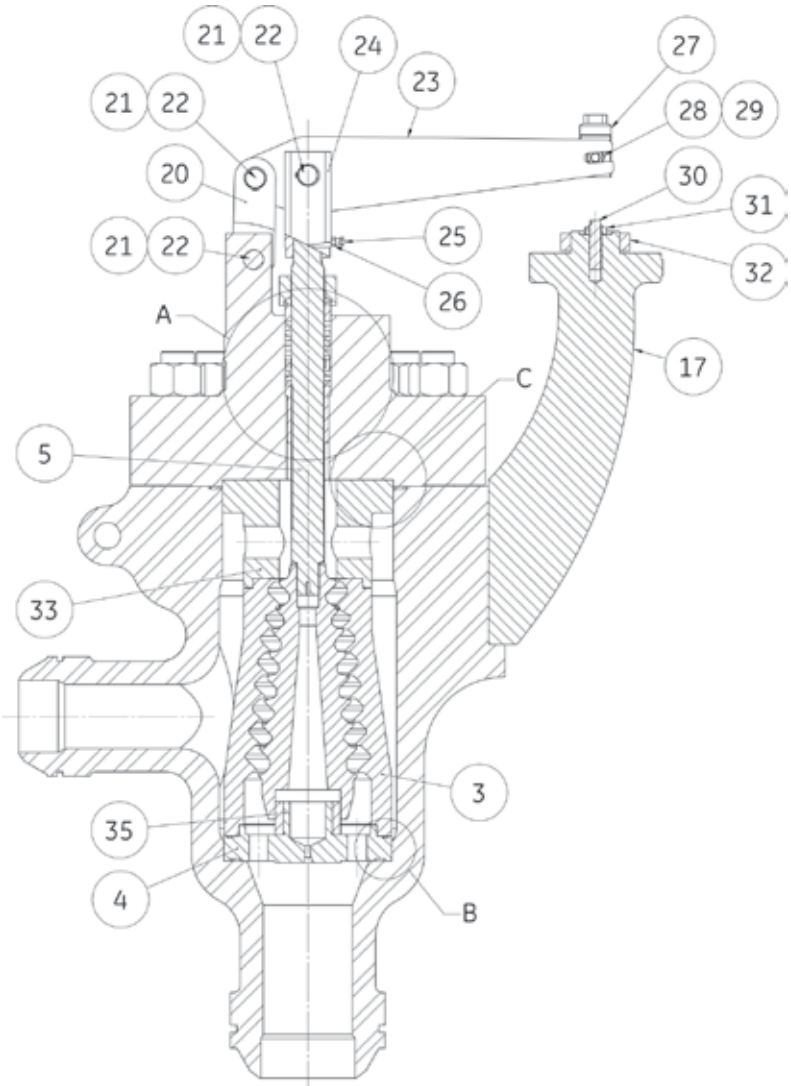
DETAIL B
SCALE 1 : 2

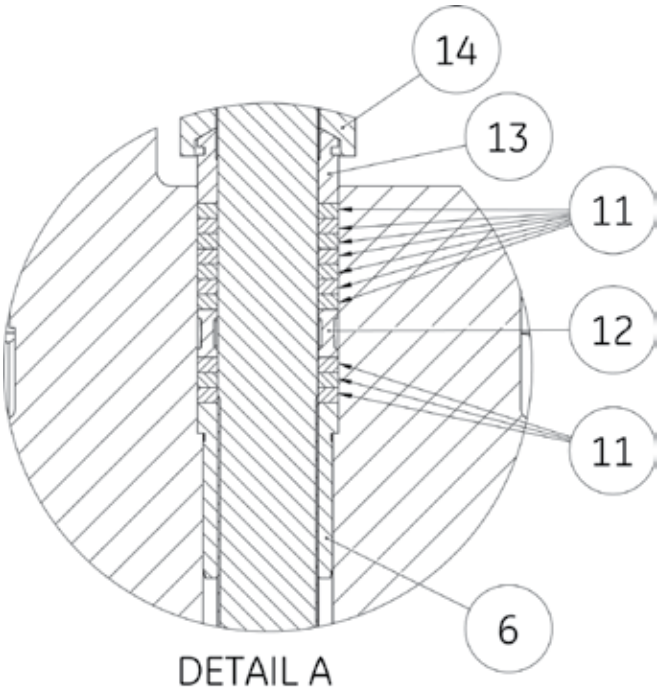
Bottom Entry 77000 Series Material Options

Ref No.	Temperature Range Description	650°F (340°C)	800°F (427°C)	950°F (510°C)	1050°F (565°C)
		Standard Materials and Optional Materials			
1	Body	ASTM A216 WCC Carbon Steel/ASTM A105 Carbon Steel			
		ASTM A217 WC6 Chrome-Moly/ASTM A182 F11 Chrome-Moly			
		ASTM A217 WC9 Chrome-Moly/ASTM A182 F22 Chrome-Moly			
		ASTM A351 CF8M Stainless Steel/ASTM A182 F316 Stainless Steel			
		ASTM A351 CF8C Stainless Steel/ASTM A182 F347 Stainless Steel			
2	Outlet Spool	ASTM A216 WCC Carbon Steel/ASTM A105 Carbon Steel			
		ASTM A217 WC6 Chrome-Moly/ASTM A182 F11 Chrome-Moly			
		ASTM A217 WC9 Chrome-Moly/ASTM A182 F22 Chrome-Moly			
		ASTM A351 CF8M Stainless Steel/ASTM A182 F316 Stainless Steel			
		ASTM A351 CF8C Stainless Steel/ASTM A182 F347 Stainless Steel			
3	Seat Ring	316 St. St. or 347 St. St. Boronized with Hardfaced Seat			
4	Spider	316 St. St. or 347 St. St.			
5	Plug Stem	316 St. St. or 347 St. St. Boronized with Hardfaced Seat			
6	Stem Guide Bushing	Stellite® 6 UNS 30006			
7	Lower Spider Gasket	316 St. St. with Flexible Graphite Filler (Spiral Wound)	Inconel® with Graphite (Spiral Wound)		
8	Upper Spider Gasket	316 St. St. with Flexible Graphite Filler (Spiral Wound)	Inconel® with Graphite (Spiral Wound)		
9	Body Stud [1]	ASTM A193 Gr B7 [2] or ASTM A193 Gr B7M [3]		ASTM A193 Gr B16	ASTM A453 Gr 660
10	Bonnet/Spool Nut [1]	ASTM A194 Gr 2H [2] or ASTM A19F Gr2HM [3]		ASTM A194 Gr 4	ASTM A194 Gr 8
11	Packing Set	Teflon® V-Ring	Flexible Graphite		
12	Lantern Ring	300 Series Stainless Steel			
13	Packing Follower	300 Series Stainless Steel			
14	Packing Flange	300 Series Stainless Steel or Chrome Moly			
15	Packing Flange Stud [1]	304 Stainless Steel ASTM A193 Gr B8 Class 2 [2] or ASTM A193 Gr B7M Nickel Plated [3]			
16	Packing Flange Nut [1]	304 Stainless Steel ASTM A194 Gr 8 [2] or ASTM A194 Gr 2HM Nickel Plated [3]			
17	Actuator Toggle Bracket	ASTM A36 Carbon Steel			
18	Bracket Stud [1]	ASTM A193 Gr B7			
19	Bracket Nut [1]	ASTM A194 Gr 2H			
20	Body Clevis	ASTM A36 Carbon Steel			
21	Body Clevis Pin	440 C Stainless Steel			
22	Body Clevis Retaining Ring	ASTM A564 Gr 632			
23	Lever	ASTM A36 Carbon Steel			
24	Stem Pivot Adapter	300 Series Stainless Steel			
25	Anti-Rotation Screw	300 Series Stainless Steel			
26	Locknut	ASTM A194 Gr 8			
27	Actuator Link Connector	300 Series Stainless Steel			
28	Actuator Link Pin	440 C Stainless Steel			
29	Actuator Link Retaining Ring	ASTM A564 Gr 632			
30	Travel Stop Stud	300 Series Stainless Steel			
31	Travel Stop Nut	300 Series Stainless Steel			
32	Drive Nut	Carbon Steel ASTM A668 CL B or ASTM A2165 Gr WCC			
36	Spud Adapter	300 Series Stainless Steel			
37	Actuator Link Clevis (Sizes from 1 to 3 inches)	ASTM A36 Carbon Steel			

Notes:
(1) Studs and Nuts are Nickel or Zinc Plated for use with Stainless Steel Bodies.
(2) Non-Nace and Nace Non-Exposed (Class III)
(3) Nace Exposed (Class I & II)







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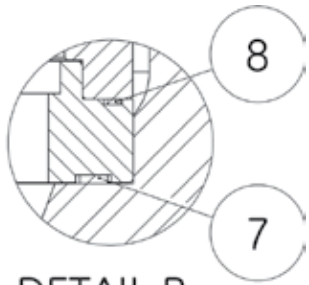
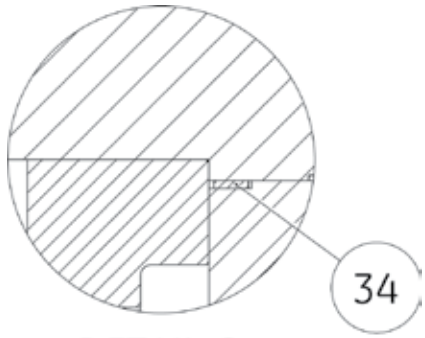


DETAIL B
SCALE 2 : 5



DETAIL C
SCALE 2 : 5
TOP ENTRY

Top Entry 77000 Series Material Options

Ref No.	Temperature Range Description	650°F (340°C) Standard Materials and Optional Materials	800°F (427°C)	950°F (510°C)	1050°F (565°C)
1	Body	ASTM A216 WCC Carbon Steel/ASTM A105 Carbon Steel			
		ASTM A217 WC6 Chrome-Moly/ASTM A182 F11 Chrome-Moly ASTM A217 WC9 Chrome-Moly/ASTM A182 F22 Chrome-Moly			
		ASTM A351 CF8M Stainless Steel/ASTM A182 F316 Stainless Steel ASTM A351 CF8C Stainless Steel/ASTM A182 F347 Stainless Steel			
2	Bonnet	ASTM A216 WCC Carbon Steel/ASTM A105 Carbon Steel			
		ASTM A217 WC6 Chrome-Moly/ STM A182 F11 Chrome-Moly ASTM A217 WC9 Chrome-Moly/ASTM A182 F22 Chrome-Moly			
		ASTM A351 CF8M Stainless Steel/ASTM A182 F316 Stainless Steel ASTM A351 CF8C Stainless Steel/ASTM A182 F347 Stainless Steel			
3	Seat Ring	316 St. St. or 347 St. St. Boronized with Hardfaced Seat			
4	Spider	316 St. St. or 347 St. St.			
5	Plug Stem	316 St. St. or 347 St. St. Boronized with Hardfaced Seat			
6	Stem Guide Bushing	Stellite® 6 UNS 30006			
7	Lower Spider Gasket	316 St. St. with Flexible Graphite Filler (Spiral Wound)	Inconel® w/ Graphite (Spiral Wound)		
8	Upper Spider Gasket	316 St. St. with Flexible Graphite Filler (Spiral Wound)	Inconel® w/ Graphite (Spiral Wound)		
9	Body Stud [1]	ASTM A193 Gr B7 [2] or ASTM A193 Gr B7M [3]		ASTM A193 Gr B16	ASTM A453 Gr 660
10	Bonnet / Spool Nut [1]	ASTM A194 Gr 2H [2] or ASTM A193 Gr 2HM [3]		ASTM A194 Gr 4	ASTM A194 Gr 8
11	Packing Set	Teflon® V-Ring	Flexible Graphite		
12	Lantern Ring	300 Series Stainless Steel			
13	Packing Follower	300 Series Stainless Steel			
14	Packing Flange	300 Series Stainless Steel or Chrome Moly			
15	Packing Flange Stud [1]	304 Stainless Steel ASTM A193 Gr B8 Class 2 [2] or ASTM A193 Gr B7M Nickel Plated [3]			
16	Packing Flange Nut [1]	304 Stainless Steel ASTM A194 Gr 8 [2] or ASTM A194 Gr 2HM Nickel Plated [3]			
17	Actuator Toggle Bracket	ASTM A36 Carbon Steel			
18	Bracket Stud [1]	ASTM A193 Gr B7			
19	Bracket Nut [1]	ASTM A194 Gr 2H			
20	Body Clevis	ASTM A36 Carbon Steel			
21	Body Clevis Pin	440 C Stainless Steel			
22	Body Clevis Retaining Ring	ASTM A564 Gr 632			
23	Lever	ASTM A36 Carbon Steel			
24	Stem Pivot Adapter	300 Series Stainless Steel			
25	Anti-Rotation Screw	300 Series Stainless Steel			
26	Locknut	ASTM A194 Gr 8			
27	Actuator Link Connector	300 Series Stainless Steel			
28	Actuator Link Pin	440 C Stainless Steel			
29	Actuator Link Retaining Ring	ASTM A564 Gr 632			
30	Travel Stop Stud	300 Series Stainless Steel			
31	Travel Stop Nut	300 Series Stainless Steel			
32	Drive Nut	Carbon Steel ASTM A668 CL B or ASTM A2165 Gr WCC			
33	Seat Ring Retainer	316 St. St. or 347 St. St.			
34	Bonnet Gasket	316 St. St. with Flexible Graphite Filler (Spiral Wound)	Inconel® with Graphite (Spiral Wound)		
35	Lower Guide Bushing	RTFE	Stellite® 6 UNS 30006		
37	Actuator Link Clevis (Sizes from 1 to 3 inches)	ASTM A36 Carbon Steel			
38	Conical Spring	Inconel 718			

Notes:
(1) Studs and Nuts are Nickel or Zinc Plated for use with Stainless Steel Bodies.
(2) Non-Nace and Nace Non-Exposed (Class III)
(3) Nace Exposed (Class I & II)

77000 Pressure Drop Tables (U.S.)

Leakage: Per IEC 534-4 and ANSI/FCI 70.2 Class IV
Packing: Graphite

Valve Size (Inches)	Plug Travel (Inches)	Actuator Size	Actuator Travel (Inches)	Air to Open		Air to Close		
				Bench Range	Allowable Pressure Drop (PSI)	Allowable Pressure Drop (PSI) Bench Range ** Supply Pressure (PSI)		
						30	35	40
1	0.25	6	0.8	21-45	4855	3435	4609	5797
1	0.25	10	0.8	21-45	7200	5797	7200	7200
1	0.25	16	0.8	21-45	7200	7200	7200	7200
2	0.25	10	1.5	21-45	3058	2159	2899	3652
2	0.25	16	1.5	11-23	2551	3493	4681	5870
2	0.25	23	1.5	11-23	3696	5058	6768	7200
2	0.25	15	1.5	12-30	3101	3884	5203	6522
2	0.25	15	1.5	14-31	3565	3884	5203	6522
3	0.38	10	2.5	21-45	1725	1435	1638	2058
3	0.38	16	2.5	21-45	2783	1971	2652	3319
3	0.38	23	2.5	11-23	2087	2855	3826	4797
3	0.38	18	2.5	12-30	2522	3159	4232	5304
3	0.38	18	2.5	15-33	3159	3159	4232	5304
4	0.50	24	3.5	9-30	2290	3841	5145	6435
4	0.50	24	3.5	18-45	4623	3841	5145	6435
4	0.50	154	3.5	35-50	3246	1435	1884	2348
4	0.50	314	3.5	35-50	6652	2290	3232	4174
6	0.50	24	3.5	19-46	3594	2638	3536	4420
6	0.50	24	3.5	21-49	4275	2638	3536	4420
6	0.50	154	3.5	35-50	2232	1435	1435	1609
6	0.50	314	3.5	35-50	4580	1565	2217	2870
8	1.00	24	3.5	(1)	(1)	(1)	(1)	(1)
8	1.00	24	3.5	(1)	(1)	(1)	(1)	(1)
8	1.00	154	3.5	(1)	(1)	(1)	(1)	(1)
8	1.00	314	3.5	(1)	(1)	(1)	(1)	(1)

** Spring Diaphragm 3-15
Piston Cylinder 154/10-14
Piston Cylinder 314/12-18

Note (1) Consult GE

Leakage: Per IEC 534-4 and ANSI/FCI 70.2 Class V
Packing: Graphite

Valve Size (Inches)	Plug Travel (Inches)	Actuator Size	Actuator Travel (Inches)	Air to Open		Air to Close		
				Bench Range	Allowable Pressure Drop (PSI)	Allowable Pressure Drop (PSI) Bench Range ** Supply Pressure (PSI)		
						30	35	40
1	0.25	6	0.8	21-45	4507	3101	4275	5449
1	0.25	10	0.8	21-45	7200	5449	7200	7200
1	0.25	16	0.8	21-45	7200	7200	7200	7200
2	0.25	10	1.5	21-45	2841	1957	2696	3435
2	0.25	16	1.5	11-23	2333	3290	4478	5667
2	0.25	23	1.5	11-23	3478	4841	6551	7200
2	0.25	15	1.5	12-30	2884	3681	5000	6304
2	0.25	15	1.5	14-31	3348	3681	5000	6304
3	0.38	10	2.5	21-45	1551	1435	1464	1899
3	0.38	16	2.5	21-45	2623	1812	2478	3159
3	0.38	23	2.5	11-23	1913	2696	3667	4638
3	0.38	18	2.5	12-30	2348	3000	4072	5145
3	0.38	18	2.5	15-33	3000	3000	4072	5145
4	0.50	24	3.5	9-30	2159	3710	5000	6304
4	0.50	24	3.5	18-45	4478	3710	5000	6304
4	0.50	154	3.5	35-50	3101	1435	1754	2217
4	0.50	314	3.5	35-50	6522	2145	3087	4043
6	0.50	24	3.5	19-46	3478	2522	3420	4304
6	0.50	24	3.5	21-49	4159	2522	3420	4304
6	0.50	154	3.5	35-50	2116	1435	1435	1493
6	0.50	314	3.5	35-50	4464	1449	2101	2754
8	1.00	24	3.5	(1)	(1)	(1)	(1)	(1)
8	1.00	24	3.5	(1)	(1)	(1)	(1)	(1)
8	1.00	154	3.5	(1)	(1)	(1)	(1)	(1)
8	1.00	314	3.5	(1)	(1)	(1)	(1)	(1)

** Spring Diaphragm 3-15
Piston Cylinder 154/10-14
Piston Cylinder 314/12-18

Note (1) Consult GE

77000 Pressure Drop Tables (U.S.)

Leakage: Per IEC 534-4 and ANSI/FCI 70.2 Class IV
Packing: PTFE

Valve Size (Inches)	Plug Travel (Inches)	Actuator Size	Actuator Travel (Inches)	Air to Open		Air to Close Allowable Pressure Drop (PSI) Bench Range ** Supply Pressure (PSI)		
				Bench Range	Allowable Pressure Drop (PSI)	30	35	40
1	0.25	6	0.8	21-45	7200	5435	7200	7200
1	0.25	10	0.8	21-45	7200	7200	7200	7200
2	0.25	10	1.5	21-45	4797	3406	4565	5725
2	0.25	16	1.5	11-23	4014	5493	7200	7200
2	0.25	23	1.5	11-23	5797	7200	7200	7200
2	0.25	15	1.5	12-30	4870	6116	7200	7200
2	0.25	15	1.5	14-31	5594	6116	7200	7200
3	0.38	10	2.5	21-45	2493	1768	2377	2986
3	0.38	16	2.5	21-45	4029	2855	3826	4812
3	0.38	23	2.5	11-23	3014	4145	5536	6942
3	0.38	18	2.5	12-30	3652	4580	6130	7200
3	0.38	18	2.5	15-33	4580	4580	6130	7200
4	0.50	24	3.5	9-30	3449	5797	7200	7200
4	0.50	24	3.5	18-45	6957	5797	7200	7200
4	0.50	154	3.5	35-50	4884	2159	2855	3551
4	0.50	314	3.5	35-50	7200	3449	4870	6290
6	0.50	24	3.5	19-46	4754	3493	4667	5841
6	0.50	24	3.5	21-49	5638	3493	4667	5841
6	0.50	154	3.5	35-50	2942	1435	1710	2130
6	0.50	314	3.5	35-50	6043	2072	2928	3783
8	1.00	24	3.5	(1)	(1)	(1)	(1)	(1)
8	1.00	24	3.5	(1)	(1)	(1)	(1)	(1)
8	1.00	154	3.5	(1)	(1)	(1)	(1)	(1)
8	1.00	314	3.5	(1)	(1)	(1)	(1)	(1)

** Spring Diaphragm 3-15
Piston Cylinder 154/10-14
Piston Cylinder 314/12-18

Note (1) Consult Factory

Leakage: Per IEC 534-4 and ANSI/FCI 70.2 Class V
Packing: PTFE

Valve Size (Inches)	Plug Travel (Inches)	Actuator Size	Actuator Travel (Inches)	Air to Open		Air to Close		
				Bench Range	Allowable Pressure Drop (PSI)	Allowable Pressure Drop (PSI) Bench Range ** Supply Pressure (PSI)		
						30	35	40
1	0.25	6	0.8	21-45	7130	4899	6768	7200
1	0.25	10	0.8	21-45	7200	7200	7200	7200
2	0.25	10	1.5	21-45	4464	3072	4232	5406
2	0.25	16	1.5	11-23	3681	5174	7029	7200
2	0.25	23	1.5	11-23	5478	7200	7200	7200
2	0.25	15	1.5	12-30	4536	5783	7200	7200
2	0.25	15	1.5	14-31	5261	5783	7200	7200
3	0.38	10	2.5	21-45	2246	1522	2130	2739
3	0.38	16	2.5	21-45	3783	2623	3594	4565
3	0.38	23	2.5	11-23	2783	3899	5304	6696
3	0.38	18	2.5	12-30	3406	4333	5884	7200
3	0.38	18	2.5	15-33	4333	4333	5884	7200
4	0.50	24	3.5	9-30	3246	5594	7200	7200
4	0.50	24	3.5	18-45	6754	5594	7200	7200
4	0.50	154	3.5	35-50	4681	1942	2652	3348
4	0.50	314	3.5	35-50	7200	3232	4667	6087
6	0.50	24	3.5	19-46	4594	3333	4507	5696
6	0.50	24	3.5	21-49	5478	3333	4507	5696
6	0.50	154	3.5	35-50	2783	1435	1565	1986
6	0.50	314	3.5	35-50	5899	1913	2783	3638
8	1.00	24	3.5	(1)	(1)	(1)	(1)	(1)
8	1.00	24	3.5	(1)	(1)	(1)	(1)	(1)
8	1.00	154	3.5	(1)	(1)	(1)	(1)	(1)
8	1.00	314	3.5	(1)	(1)	(1)	(1)	(1)

** Spring Diaphragm 3-15
Piston Cylinder 154/10-14
Piston Cylinder 314/12-18

Note (1) Consult Factory

77000 Pressure Drop Tables (Metric)

Leakage: Per IEC 534-4 and ANSI/FCI 70.2 Class IV
Packing: Graphite

Valve Size (Inches)	Plug Travel (mm)	Actuator Size	Actuator Travel (mm)	Air to Open		Air to Close Allowable Pressure Drop (Bar) Bench Range ** Supply Pressure (Bar)		
				Bench Range	Allowable Pressure Drop (Bar)	2.1	2.4	2.8
1	6	6	20	21-45	335	237	318	400
1	6	10	20	21-45	497	400	497	497
1	6	16	20	21-45	497	497	497	497
2	6	10	38	21-45	211	149	200	252
2	6	16	38	11-23	176	241	323	405
2	6	23	38	11-23	255	349	467	497
2	6	15	38	12-30	214	268	359	450
2	6	15	38	14-31	246	268	359	450
3	9	10	63	21-45	119	99	113	142
3	9	16	63	21-45	192	136	183	229
3	9	23	63	11-23	144	197	264	331
3	9	18	63	12-30	174	218	292	366
3	9	18	63	15-33	218	218	292	366
4	13	24	88	9-30	158	265	355	444
4	13	24	88	18-45	319	265	355	444
4	13	154	88	35-50	224	99	130	162
4	13	314	88	35-50	459	158	223	288
6	13	24	88	19-46	248	182	244	305
6	13	24	88	21-49	295	182	244	305
6	13	154	88	35-50	154	99	99	111
6	13	314	88	35-50	316	108	153	198
8	25	24	88	(1)	(1)	(1)	(1)	(1)
8	25	24	88	(1)	(1)	(1)	(1)	(1)
8	25	154	88	(1)	(1)	(1)	(1)	(1)
8	25	314	88	(1)	(1)	(1)	(1)	(1)

** Spring Diaphragm 3-15
Piston Cylinder 154/10-14
Piston Cylinder 314/12-18

Note (1) Consult Factory

Leakage: Per IEC 534-4 and ANSI/FCI 70.2 Class V
Packing: Graphite

Valve Size (Inches)	Plug Travel (mm)	Actuator Size	Actuator Travel (mm)	Air to Open		Air to Close		
				Bench Range	Allowable Pressure Drop (Bar)	Allowable Pressure Drop (Bar) Bench Range ** Supply Pressure (Bar)		
						2.1	2.4	2.8
1	0.25	6	20	21-45	311	214	295	376
1	0.25	10	20	21-45	497	376	497	497
1	0.25	16	20	21-45	497	497	497	497
2	6	10	38	21-45	196	135	186	237
2	6	16	38	11-23	161	227	309	391
2	6	23	38	11-23	240	334	452	497
2	6	15	38	12-30	199	254	345	435
2	6	15	38	14-31	231	254	345	435
3	9	10	63	21-45	107	99	101	131
3	9	16	63	21-45	181	125	171	218
3	9	23	63	11-23	132	186	253	320
3	9	18	63	12-30	162	207	281	355
3	9	18	63	15-33	207	207	281	355
4	13	24	88	9-30	149	256	345	435
4	13	24	88	18-45	309	256	345	435
4	13	154	88	35-50	214	99	121	153
4	13	314	88	35-50	450	148	213	279
6	13	24	88	19-46	240	174	236	297
6	13	24	88	21-49	287	174	236	297
6	13	154	88	35-50	146	99	99	103
6	13	314	88	35-50	308	100	145	190
8	25	24	88	(1)	(1)	(1)	(1)	(1)
8	25	24	88	(1)	(1)	(1)	(1)	(1)
8	25	154	88	(1)	(1)	(1)	(1)	(1)
8	25	314	88	(1)	(1)	(1)	(1)	(1)

** Spring Diaphragm 3-15
Piston Cylinder 154/10-14
Piston Cylinder 314/12-18

Note (1) Consult Factory

77000 Pressure Drop Tables (Metric)

Leakage: Per IEC 534-4 and ANSI/FCI 70.2 Class IV
Packing: PTFE

Valve Size (Inches)	Plug Travel (mm)	Actuator Size	Actuator Travel (mm)	Air to Open		Air to Close Allowable Pressure Drop (Bar) Bench Range ** Supply Pressure (Bar)		
				Bench Range	Allowable Pressure Drop (Bar)	2.1	2.4	2.8
1	6	6	20	21-45	497	375	497	497
1	6	10	20	21-45	497	497	497	497
2	6	10	38	21-45	331	235	315	395
2	6	16	38	11-23	277	379	497	497
2	6	23	38	11-23	400	497	497	497
2	6	15	38	12-30	336	422	497	497
2	6	15	38	14-31	386	422	497	497
3	9	10	63	21-45	172	122	164	206
3	9	16	63	21-45	278	197	264	332
3	9	23	63	11-23	208	286	382	479
3	9	18	63	12-30	252	316	423	497
3	9	18	63	15-33	316	316	423	497
4	13	24	88	9-30	238	400	497	497
4	13	24	88	18-45	480	400	497	497
4	13	154	88	35-50	337	149	197	245
4	13	314	88	35-50	497	238	336	434
6	13	24	88	19-46	328	241	322	403
6	13	24	88	21-49	389	241	322	403
6	13	154	88	35-50	203	99	118	147
6	13	314	88	35-50	417	143	202	261
8	25	24	88	(1)	(1)	(1)	(1)	(1)
8	25	24	88	(1)	(1)	(1)	(1)	(1)
8	25	154	88	(1)	(1)	(1)	(1)	(1)
8	25	314	88	(1)	(1)	(1)	(1)	(1)

** Spring Diaphragm 3-15
Piston Cylinder 154/10-14
Piston Cylinder 314/12-18

Note (1) Consult GE

Leakage: Per IEC 534-4 and ANSI/FCI 70.2 Class V
Packing: PTFE

Valve Size (Inches)	Plug Travel (mm)	Actuator Size	Actuator Travel (mm)	Air to Open		Air to Close Allowable Pressure Drop (Bar) Bench Range ** Supply Pressure (Bar)		
				Bench Range	Allowable Pressure Drop (Bar)	2.1	2.4	2.8
1	6	6	20	21-45	497	338	467	497
1	6	10	20	21-45	497	497	467	497
2	6	10	38	21-45	308	212	292	373
2	6	16	38	11-23	254	357	485	497
2	6	23	38	11-23	378	497	497	497
2	6	15	38	12-30	313	399	497	497
2	6	15	38	14-31	363	399	497	497
3	9	10	63	21-45	155	105	147	189
3	9	16	63	21-45	261	181	248	315
3	9	23	63	11-23	192	269	366	462
3	9	18	63	12-30	235	299	406	497
3	9	18	63	15-33	299	299	406	497
4	13	24	88	9-30	224	386	497	497
4	13	24	88	18-45	466	386	497	497
4	13	154	88	35-50	323	134	183	231
4	13	314	88	35-50	497	223	322	420
6	13	24	88	19-46	317	230	311	393
6	13	24	88	21-49	378	230	311	393
6	13	154	88	35-50	192	99	108	137
6	13	314	88	35-50	407	132	192	251
8	25	24	88	(1)	(1)	(1)	(1)	(1)
8	25	24	88	(1)	(1)	(1)	(1)	(1)
8	25	154	88	(1)	(1)	(1)	(1)	(1)
8	25	314	88	(1)	(1)	(1)	(1)	(1)

** Spring Diaphragm 3-15
Piston Cylinder 154/10-14
Piston Cylinder 314/12-18

Note (1) Consult GE

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